

Sectors 11 and 12



Basic Energy Sciences Synchrotron Radiation Center CAT

Overview

The Basic Energy Sciences Synchrotron Radiation Center CAT (BESSRC-CAT) includes scientists from the Chemistry and Materials Science Divisions at Argonne National Laboratory (ANL), researchers from the ANL geophysics program, and scientists from the Department of Physics at Northern Illinois University. Its two sectors are developed and instrumented to serve the research needs of users with particular interests in materials science, chemical science, atomic physics, solid-state physics, and geosciences. The facility's two sectors are equipped with seven separate instrumental stations. One sector consists of an undulator and bending magnet with four experiment stations. The other sector has an elliptical multipole wiggler and is split into three beamlines with three experiment stations.

Research Focus

Scientific areas of interest include time-resolved studies of photoexcited states in photosynthetic materials, real-time investigations of chemical reactions, and time-dependent studies of phase transformations in crystalline compounds. Spectroscopic studies of actinide materials, studies of ultra-small crystals, trace-element analysis, and surface and interface studies also form part of the research focus. Examples of studies conducted include radiation-induced surface modification, impurity clustering at grain boundaries, measurements of the electrical double layer at electrodes in electrochemical cells, concentration profiling at dissimilar interfaces, studies of the magnetic structure of ultrathin films, and others.

BESSRC-CAT has an MOCVD system in the undulator beamline for *in situ* growth studies of oxides and GaN and also an MBE system on line for structural studies of surfaces and interfaces under UHV conditions. There is an extensive research program in the use of small-angle x-ray scattering and anomalous small-angle x-ray scattering with particular emphasis on time-resolved measurements. BESSRC-CAT has established a research program directed towards the use of high-energy diffraction techniques to study the structure of materials. Additionally, an extensive research program is directed towards the use of circularly polarized x-rays in the study of the magnetic properties of materials, i.e., using XMCD, magnetic Compton scattering, and magnetic scattering.

CAT contacts:	Randy Winans, <i>CAT Director</i>	tel 630.252.7479	rewinans@anl.gov
	Mark Beno, <i>Deputy CAT Director</i>	tel 630.252.3507	beno@anl.gov
	Jeanne Cowan, <i>Admin. Assistant</i>	tel 630.252.1553	cowan@anl.gov
Beamline contacts:	Klaus Attenkofer, <i>(11-ID)</i>	tel 630.252.0383	attenkofer@anl.gov
	Mark Beno, <i>(11-ID, 12-BM & -ID)</i>	tel 630.252.3507	beno@anl.gov
	Jennifer Linton, <i>(12-BM & -ID)</i>	tel 630.252.5007	linton@msd.anl